1,071,556

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in and relating to Screw-Sockets for Fixing in Holes in Hard Material

We, N. V. HUYGMETAAL, of 238, Eikbosserweg, Hilversum, the Netherlands, a Netherlands Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a screw socket adapted to be fixed in a hole in hard material such as concrete, of the kind comprising a bushing which is slit along a part of its length and an insertable piece having a tapered wall part which piece is adapted to enter the said bushing.

Devices of this kind wherein a tapering insertable piece serves to drive the tongues of the slit wall part of the bushing outwardly and thus to fasten the socket in a drilled hole are known in many different forms.

It is an object of the invention to take full advantage of the fact that by modern drilling means bores of exactly reproduceable dimensions can be drilled in hard material and to shape the socket and its insertable piece in such a way that labour is reduced and the fastening improved.

Until now a difficulty resided in the great hardness of the small concrete grains often left behind in the drilled hole because not much time could be allowed for cleaning the hole, e.g. by blowing air therein. Moreover grains of hard material are unavoidably broken off from the bore walls when the bushing is inserted in the bore and when the insertable piece is driven in by striking upon the end of the bushing.

The present invention consists in a hollow screw socket adapted to be fixed in a hole in hard material such as concrete, comprising a bushing which is slit along a part of its length and an insertable piece having a tapered wall part adapted to enter the end of the said bushing when the latter is driven into a hole, which insertable piece comprises a disc-shaped bottom part of diameter smaller than the outer diameter of the bushing but substantially larger than the diameter of the adjoining part of the insertable piece.

It has been found that the annular space thus obtained in the hole, bounded by the periphery of the part of the insertable piece protruding from the bushing, the disc-shaped bottom part, and the wall of the hole provides for sufficient space to take up grains left behind in the bore or broken from the wall of the drilled hole. It is found that fastenings of uniform solidity can now be obtained in a very reproduceable way with the use of an insertable piece of very small length and further that the bushing can always be driven in along exactly equal lengths and without great differences in the required driving energy. The end of the bushing can always be brought level with the wall face as the advantage of the exact depth of the bore obtainable by modern means in hard material is not disturbed now by grains of hard material in the bore.

In a particularly favourable embodiment capable of meeting even extraordinarily unfavourable accidental circumstances such as cannot always be avoided, the bushing is made from hardened material, the solid insertable piece from softer material. If, for example the tongues of the bushing were opposite a part of the bore wall where practically no play exists and where the wall is extremely hard, as occurs when the bore passes along or partly through a piece of gravel, only a small expansion of the split bushing part can be obtained and the insertable piece might not be able to enter the bushing for the desired distance so that the head of the bushing would still extend somewhat from the wall face. This could bring the person handling the bushing to drive extremely hard and persistently which would cause loss of time and possibly danger of damage. However, because now only the bushing is made from hardened material such as hardened steel, the insertable piece made

[*Price*

of softer non-hardened material will be able to become deformed within the bushing and the desired final position can now be reached without applying excessive driving forces.

The invention will now be further explained with reference to an exemplary embodiment which is shown in the accompanying drawing, in which:

Figure 1 shows in its left half in elevational view and in its right half in cross section along the longitudinal axis a bushing of a screw-socket embodying the invention, one half of an insertable piece in its initial position being shown in side view in the right hand half of the drawing;

Figure 2 is a corresponding top-view; and

Figure 3 is a side view of the insertable piece on a larger scale.

The bushing is indicated by 1 and in Figure 1 it can be seen that it is incised longitudinally from one end for half its length by four slits 2 so as to form four tongues 10. The insertable piece, adapted to enter the bushing 1, is indicated by 3 and a tapered wall part of the insertable piece by 4. This tapered part has an inclination of 8°. One of the greatest dimensions used in practice has a bushing of 88 mm. length and 32 mm. outer diameter. The different parts have been shown in the drawing about in the right proportions and it can be seen therefrom that a small length of the insertable piece 3 is indeed sufficient. In large building projects holes for fixing fastening means must be used in numbers of thousands so that it will be clear that simplifications and improvements as to these fastening means bring immediately large savings as to labour and material. Small dimensions of the insertable piece are made possible because a tapered length of 13 mm with a difference of only about 2 mm will be sufficient for fastening purposes in concrete walls but now care has been taken that with such small dimensions still no disturbance is caused by loose grains. For this purpose the bushing 1 bears a solid insertable piece 3, which comprises at its bottom end a disc 8 having a diameter somewhat smaller than the outer diameter of the bushing but substantially larger than the diameter of the adjoining part of the insertable piece 3. In order to provide a large circumferential space a groove 7 adjoins the disc 8 and is followed by the tapered part 4 which broadens towards the groove 7, but the outermost end 9 of the piece 3, remote from the disc 8, has a cylindrical shape and fits into the inner end of the bushing 1.

When the unit consisting of bushing 1 and piece 3 is inserted into a hole drilled in a concrete wall, piece 3 entering the hole first, the unit can be pushed in by hand until the disc 8 comes to rest on the bottom of the hole. The diameter of the disc 8 being somewhat smaller than that of the bushing 1, powder or granular material falling from the wall of the bore or left on the bottom of the bore easily enters the groove 7 and this function proceeds when the piece 3 is caused to enter the bushing by blows on the outer end of the bushing 1 to drive the bushing into the hole. During the driving process also the function of an additional circumferential annular groove 6, which is provided directly behind the forward abutment end 5 of the bushing 1, shows to full advantage. On driving in the bushing 1 the tongues 10 are spread by the tapered part 4 of piece 3 and some material is loosened which falls automatically into the groove 6 or is pushed into the ring groove 7 if it settles down before the end of the bushing 1. As already mentioned, the bushing is made from case-carburized and hardened steel, the insertable piece from softer, non-hardened steel.

The bushing 1 ends in a frusto-conical edge 11 which facilitates the sliding of the bushing into the bore and by which also a projecting rim 12 is formed at the transition to the groove 6. The rim 12 is very favourable for solid fixation of the bushing 1 in the bore when the tongues 10 spread, as this rim is pressed with a very great force against the wall of the bore. Further a milled rim 13 on the outer circumference of the bushing 1 adjoins the groove 6 about halfway along the length of the incisions 2, fulfilling a corresponding function to the rim 12 but also providing great resistance against rotation of the bushing in the bore as the ribs of the milling run parallel to the longitudinal axis of the bushing. The groove 6 has a circularly curved bottom cross section by which a sufficient space within the groove is obtained without appreciable weakening of the wall and with a sufficient depth in the middle part for storing larger grains.

The non-slit part only of the bushing is provided with an inner screw thread 14 so that after fixing the bushing 1 in the wall a bolt or hook with a threaded end or other support means of this kind can be screwed therein for fastening or suspending purposes.

The screw thread 14 is continued to the outer end of the bushing 1 onto a widening 15 of the inner cross section thereof. This is intended to prevent damaging of the screw thread on striking upon the bushing but it can serve at the same time for countersinking the head of a screw or a ring part to be fastened under the latter.

WHAT WE CLAIM IS:—

1. A hollow screw socket to be fixed in a hole in hard material such as concrete, comprising a bushing which is slit along a part of its length and an insertable piece having a tapered wall part adapted to enter the end of the said bushing when the latter is driven into a hole, which insertable piece comprises a disc-shaped bottom part of diameter smaller than the outer diameter of the bushing but substantially larger than the diameter of the

adjoining part of the insertable piece.

2. A hollow screw socket according to claim 1, in which the bushing 1 is made from hardened material and the insertable piece 3 is solid and made from softer material.

3. A hollow screw socket according to claim 1 or 2, in which the bushing is provided with a circumferential annular groove on its outer circumference behind its forward abutment end, the insertable piece being provided with a circumferential groove between its disc-shaped bottom part and the tapered wall part.

4. A hollow screw socket according to claim 3, in which the bushing is provided with a circumferential milled surface part about halfway along the slit part of the bushing and adjoining the annular groove therein.

5. A hollow screw socket according to any of the preceding claims, in which the bushing is provided, in its non-slit part only, with an internal screw thread which runs out into a widening of the internal diameter of the bushing at the outermost end of the bushing.

6. A hollow screw socket substantially as herein described with reference to the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

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1071556 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

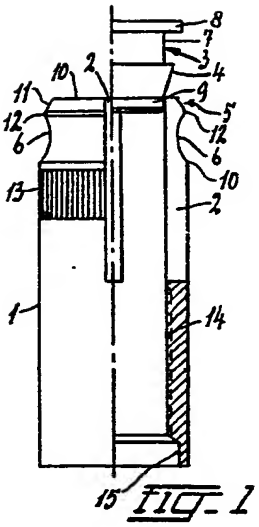

FIG. 1

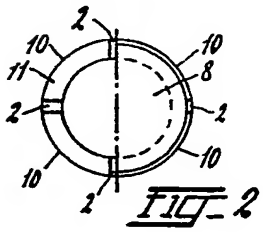

FIG. 2

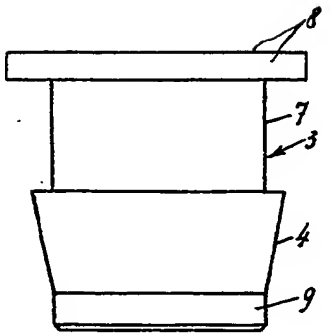

FIG. 3